CLAIMS

1. A method of manufacturing a semiconductor device, comprising:

the process of forming a semiconductor thin film having the amorphous structure containing silicon as the main component;

the step of adding metal to said semiconductor thin film having the amorphous structure;

the process of reforming said semiconductor thin film having the amorphous structure into a crystalline semiconductor thin film containing silicon as the main component by a first heat treatment;

the process of forming an island-like insulating film;

the process of adding a nonmetal element or ion of the nonmetal element to said crystalline semiconductor thin film with said island-like insulating film as a mask to form a region in which the nonmetal element or the ions of the nonmetal element has(have) been added to said crystalline semiconductor thin film; and

the process of subjecting said crystalline semiconductor thin film to a second heat treatment to getter said metal to the region to which said nonmetal element or the ions of said nonmetal element has(have) been added,

wherein the shape of said island-like insulating film for the surface parallel with the surface of said crystalline semiconductor thin film is a polygon having n ($n > 20$) vertexes, and also is a

polygon having m (m > 8) vertexes, in each of which the interior angle is equal to or higher than 180°C.

2. A method of manufacturing a semiconductor device according to claim 1, wherein said metal is selected from the group consisting of nickel (Ni), cobalt (Co), palladium (Pd), platinum (Pt) and copper (Cu).

3. A method of manufacturing a semiconductor device according to claim 1, wherein said first heat treatment is performed at the temperature equal to or higher than 400°C and equal to or lower than 700°C.

4. A method of manufacturing a semiconductor device according to claim 1, wherein said nonmetal element or ions of said nonmetal element is one kind or plural kinds of elements selected from the group consisting of boron(B), silicon (Si), phosphorus (P), arsenic (As), helium (He), neon (Ne), argon (Ar), krypton (Kr) and xenon (Xe).

5. A method of manufacturing a semiconductor device according to claim 1, wherein said second heat treatment is performed at the temperature equal to or higher than 400°C but equal to or lower than 1,000°C.

6. A method of manufacturing a semiconductor device, comprising:

the process of forming a semiconductor thin film having the amorphous structure containing silicon as the main component;

the step of adding metal to said semiconductor thin film having the amorphous structure;

the process of reforming said semiconductor thin film having the amorphous structure into the crystalline semiconductor thin film containing silicon as the main component by a first heat treatment;

the process of forming an island-like insulating film;

the process of adding a nonmetal element or ions of the nonmetal element to said crystalline semiconductor thin film with said island-like insulating film as a mask to form a region in which the nonmetal element or the ions of the nonmetal element has(have) been added to said crystalline semiconductor thin film; and

the process of subjecting said crystalline semiconductor thin film to a second heat treatment to getter said metal for the region to which said nonmetal element or the ions of said nonmetal element has(have) been added.

7. A method of manufacturing a semiconductor device according to claim 6, wherein said metal is selected from the group consisting of nickel (Ni), cobalt (Co), palladium (Pd), platinum (Pt) and copper (Cu).

8. A method of manufacturing a semiconductor device according to claim 6, wherein said nonmetal element or ions of said nonmetal element is(are) one kind of or a plurality kinds of elements which is(are) selected from the group consisting of boron(B), silicon (Si), phosphorus (P), arsenic (As), helium (He), neon (Ne), argon (Ar), krypton (Kr) and xenon (Xe).

9. A method of manufacturing a semiconductor device according to claim 8, wherein said argon is added to said crystalline semiconductor thin film at the acceleration voltage of 90 keV with a dose of 2×10^{15} /cm^2.